USEPA Review of the Draft Final Status Survey Results, Former 500 Series Building Area, Former Hunter's Point Naval Shipyard (HPNS), San Francisco, California, Draft dated May 2017, EPA Comments dated August, 2017

GENERAL COMMENT

1. The Draft Final Status Survey Results, Former 500 Series Building Area, Former Hunter's Point Naval Shipyard (HPNS), San Francisco, California (FSS Report) describes several instances where a final review of radionuclide data found that the results for Bismuth-214 (Bi-214), Lead-214 (Pb-214), and Radium-226 (Ra-226) indicated the samples were not representative of the respective areas the samples were originally collected from. However, the Report does not state how much of the data was reviewed to determine if such anomalous results existed. Further, the FSS Report does not indicate if the final data review that determined some results were anomalous was performed as part of a routine laboratory or project personnel review, resulted from a formal data validation or data quality assessment, or if the final data review was performed at the request of/by the Radiological Affairs Support Office (RASO) as part of an audit or other such random review. In order to support the conclusion that all final reported results and decisions regarding the release of the Former 500 Series Building Area are justifiable and defensible, please revise the FSS Report to provide a more thorough description of the data review/data quality assessment project requirements, Please ensure the additional description includes information about the frequency of such reviews (i.e., percentage of data receiving final reviews), what the reviews included, and where the these reviews are documented.

1. The Draft Final Status Survey Results, states the results of surveys and sampling performed by Tetra Tech EC, Inc. (TtEC) was completed to support the unrestricted use of the 500 Series Building Area. U.S. EPA's "Radiation Risk Assessment at CERCLA Sites: Q & A" states "The PRG calculators (U.S. EPA 2002a, 2007, 2009a), which are used to develop risk-based PRGs for radionuclides, are recommended by EPA for Superfund remedial radiation risk assessments." (Source: https://epa-prgs.ornl.gov/radionuclides/RadRiskQAwithtransmitmemo_June_13_2014.pdf) As one of multiple lines of evidence, please show results of risk estimates from the EPA PRG Calculators. This addition would help demonstrate consistency with U.S. EPA's CERCLA approaches. The software is public and free. The human health PRG calculator is at https://epa-prgs.ornl.gov/radionuclides/.

EPA performed an evaluation of the potential risk posed by residual radiological contamination within the boundaries of the former 500 Series Building Area to a member of the public in a residential setting using the US EPA's Preliminary Remediation Goal for Radionuclides Calculator. The radionuclides of concern (ROCs) for this area included Americium-241 (Am-241), Cesium-137 (Cs-137), Radium-226 (Ra-226), and Strontium-90 (Sr-90). Two survey units (SUs) of the twenty-seven total number of SUs for this area were selected for analysis based on having the highest concentrations of ROCs. All of the SUs were identified as Multi-Agency Radiological Site Survey and Investigation Manual (MARSSIM) Class 1 SUs, and measured between approximately

1,000 – 2,000 square meters (m^2) in size. User defined assumptions for the PRG Calculations included the following:

- The Survey Unit (SU) size was assumed to be 10000 m^2
- The media that is contaminated and is modeled for estimation of risk is soil, external exposure, and air
- No soil cover was present (Note: in the future a durable cover will be installed, which will provide additional shielding)
- No ingestion of produce
- The Climate Zone for the particulate emission factor was San Francisco

The following list provides the risk outputs from the PRG Radionuclide Calculator analysis:

a. The total risk for SU 10 with the maximum Ra-226 value for all SUs at 0.379 picoCuries per gram (pCi/g), and the maximum Am-241 value for all SUs at 0.127 pCi/g, results in an excess lifetime cancer risk (ELCR) of 3.12 E-05.

b. The total risk for SU 11 with the maximum Sr-90 result for all SUs at 0.254 pCi/g results in an ELCR of 1.49 E-05.

The PRG Calculator-generated risk values fall within the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) acceptable risk range of 10E-04 – 10E-06. See Table 1 (attached) for results.

SPECIFIC COMMENTS

1. **Figure 4-1, Former 500 Series Buildings Area, Page 4-3:** It is unclear if the area north of former Building 505 (i.e., between the Building and H Street) was part of Survey Unit 26. Please revise the figure to clarify the survey unit that covered the area north of Building 505.

2. **Section 5.3, Anomaly Removal, Page 5-1:** Section 5.3 describes the discovery and removal of anomalies identified during the initial walkover surveys; but it does not include any descriptions of the objects that were found to be radioactive and which were removed. For instance, the text does not indicate if the anomalies were thought to be old radionuclide sources, contaminated scrap material, or something else. In order to provide context for the description of anomaly removal and to enhance the level of knowledge regarding site conditions, please revise this section to describe the physical/chemical composition of the removed anomalies and to specifically state if it was determined the objects were radionuclide sources, or alternatively to state what the objects were thought to be.

3. **Section 5.11.3, Survey Unit 3, Page 5-8:** This section states that during review of the sample analytical data for Survey Unit 3, the previous post-remediation samples were identified as having much lower Ra-226, Bismuth-214 (Bi-214), and Lead-214 (Pb-214)

and Potassium 40 (K-40) activities than any of the previous samples collected from the same footprint, indicating these samples were not representative of Survey Unit (SU) soils. However, the text does not indicate if the anomalous sample results were associated with the on-site laboratory or the off-site DoD ELAP laboratory. Please revise this section and all pertinent subsequent sections to specify if sample results that were determined not to be representative of the SU, were obtained from the on-site or the off-site DoD ELAP laboratory.

4. **Section 5.11.5, Survey Unit 5, Page 5-9:** This section does not specify if soil samples 45 to 52, collected to confirm whether four original final status survey systematic samples (24, 25, 30, and 31); two characterization samples (40, 41), and two post-remediation samples (42, 43) were representative of the Survey Unit 5 soil, were analyzed at the on-site laboratory or at the off-site DoD ELAP laboratory, or both. Further, this section states "the analytical results for one of the post-remediation soil samples (sample point 51) exceeded the release criterion for Ra-226 at 1.97 picocuries per gram (pCi/g). Sample point 51 was subsequently forwarded to the onsite DoD ELAP laboratory for definitive analysis." This last statement appears to indicate that samples 45-50 and 52 may only have been analyzed at the on-site lab. Please revise this section to specify the laboratory(ies) at which samples 45-50 and 52 were analyzed at, and to change reference to the DoD ELAP laboratory as an on-site lab, to off-site lab.

5. **Section 5.11.10, Survey Unit 10, Page 5-11:** This section states that some of the original systematic samples were determined not to be representative of the SU 10 soils, therefore systematic samples were re-collected and analyzed at the on-site lab. The text indicates the second set of samples confirmed that no radionuclides of concern (ROCs) exceeded radionuclide-specific release criteria; however, the text does not indicate whether these results were confirmed at the off-site DoD ELAP laboratory. Please revise this section to state whether the additional and final systematic soil samples were analyzed at the off-site DoD ELAP laboratory following on-site analysis. If they were not, please revise the text to explain why these samples were not sent to the off-site DoD ELAP lab for analysis and how it was determined the on-site lab results were sufficiently defensible.

6. **Section 5.11.21, Survey Unit 21, Page 5-22:** This section states that analytical results for sample points 92 and 93 collected on the far side of a slab did not reveal any ROC concentrations above the release criteria; however, the text does not indicate whether these two samples were sent to the off-site DoD ELAP laboratory. Please revise this section to specify whether samples 92 and 93 were analyzed by the on-site lab, the off-site DoD ELAP lab, or both.

7. **Section 5.11.26, Survey Unit 26, Page 5-27:** This section states that three systematic sample points 16, 24, and 31, were identified as having different Bi-214, Pb-214 and Ra-226 activity than previous samples and re-sampling (samples 37, 38, 39) revealed activity similar to the original samples. However, the text does not indicate if the additional soils samples from points 37, 38, and 39 were analyzed at the on-site lab, the off-site DoD ELAP lab, or both. For clarity and completeness, please revise this section to specify the laboratory(ies) at which samples at points 37, 38, and 39 were analyzed. If these samples

were not analyzed at the off-site DoD ELAP lab, please indicate how the results are considered final and defensible for decision making.

8. **Section 5.11.27, Survey Unit 27, Page 5-28:** This section states sample points 2, 12, and 24 were identified as having different Bi-214, Pb-214, and Ra-226 activities than previous samples in SU 27, but describes the re-sampling and analysis of the same sample points as samples 37, 38, and 39 which were the same numbers used for resampling in SU 26 (i.e., in Section 5.11.26). As such, it is unclear if samples 37 to 39 are the correct number for the additional soil samples. Please revise this section to provide the correct sample point numbers for the re-sampling and analysis of soils in SU 27, and to state the laboratory(ies) that analyzed these samples to confirm that all ROCs were below the radionuclide-specific release criteria.

9. **Section 5.13.8, Former Building 520, Page 5-44:** This section contains conflicting information regarding the ROCs that were found to exceed release criteria. The text states that Cs-137 and Ra-226 contamination was identified and remediated; however, subsequent text indicates twelve samples exceeded the release criteria for Cs-137 and three samples exceeded the release criteria for Strontium-90 (Sr-90). Please revise this section to clarify if Cs-137, Ra-226, and Sr-90 were all found to exceed the respective release criteria, or if only two of the three radionuclides were found at levels exceeding the release criteria. If all three radionuclides exceeded the release criteria, revise the text to provide additional information about the exceedances of the Ra-226 release criterion.

10. **Section 6.4.1, Instrument for the Gamma Scan Measurement of Gamma Surface Activity, Page 6-2:** The RASO-approved drive-over array system for obtaining gamma scan measurements for the Former 500 Series Building land area investigations is stated to include 12 x 39 x 1.5 inch DA372 organic plastic scintillators; however these detectors are not sufficiently described (e.g., crystal/detection type, energy range, etc.). In addition, Section 7.0 (Detection Sensitivity – Static and Scan Minimum Detectable Concentrations) does not include information on the derivation of the minimum detectable concentration (MDC) or the scanning minimum detectable count rate for this detection system. Further, information on these detectors does not appear to be included in Appendix A (Instrument Description). To ensure that the FSS Report provides sufficient documentation and justification of the conclusions provided therein, please revise Section 6.4.1, Section 7.0, and Appendix A to provide this information.

11. **Section 12.0, Conclusions, Page 12-1:** This section does not describe the number of samples that identified the presence of Sr-90 (e.g., at Former Building 520), although it does discuss the number of samples that identified the presence of Cs-137 and Ra-226. For consistency, please revise the text to discuss the number of samples that identified the presence of Sr-90.

Table 1

Preliminary Remediation Goal Calculator Results for 500 Series Survey Units August 16, 2017

Survey Unit	Area (m^2)	Residual Activity MDA/MDL (pCi/g)					Farmer ResRad Risk (ELCR)	Resident PRG Risk (ELCR) Soil Exposure
		^{241}Am	^{137}Cs	^{239}Pu	^{226}Ra	^{90}Sr		
1	1,555.	0.082	0.04	0.025	0.00	0.18	1.319E-05	
2	1,716.	0.089	0.04	0.037	0.25	0.17	7.954E-05	
3	1,183.	0.014	0.01	0.002	0.27	0.04	7.801E-05	
4	1,646.	0.086	0.04	0.021	0.23	0.18	7.698E-05	
5	1,904.	0.100	0.03	0.027	0.15	0.19	5.534E-05	
6	1,417.	0.090	0.04	0.018	0.07	0.22	3.421E-05	
7	1,703.	0.096	0.04	0.015	0.21	0.24	7.325E-05	
8	1,921.	0.087	0.04	0.022	0.32	0.22	1.034E-04	
9	1,533.	0.068	0.03	0.024		0.19	1.140E-05	
10	1,231.	0.127	0.03	0.020	0.37	0.12	1.121E-04	3.12E-05
11	1,496.	0.084	0.03	0.018	0.16	0.25	6.073E-05	1.49E-05
12	1,730.	0.090	0.03	0.027	0.15	0.17	5.307E-05	
13	1,902.	0.082	0.03	0.020	0.10	0.20	4.151E-05	
14	1,769.	0.084	0.03	0.017	0.11	0.19	4.408E-05	
15	1,760.	0.103	0.04	0.015	0.22	0.10	6.943E-05	
16	1,320.	0.082	0.04	0.015	0.07	0.19	3.311E-05	
17	1,890.	0.092	0.04	0.021	0.07	0.20	3.390E-05	
18	1,741.	0.089	0.04	0.020	0.18	0.20	6.348E-05	
19	1,580.	0.080	0.03	0.032	0.04	0.21	2.410E-05	
20	1,493.	0.085	0.04	0.024	0.05	0.17	2.579E-05	
21	1,171.	0.082	0.03	0.024	0.03	0.17	1.964E-05	
22	1,125.	0.096	0.04	0.029	0.18	0.18	6.242E-05	
23	1,925.	0.093	0.04	0.020	0.27	0.23	8.964E-05	
24	1,183.	0.082	0.04	0.026	0.12	0.20	4.768E-05	
26	1,752.	0.077	0.04	0.020		0.19	1.131E-05	
27	1,816.	0.070	0.03	0.021		0.23	1.356E-05	